

## Long term behavior of H $\alpha$ -emission in BU Tau (Pleione)

One approach to better understand Be stars is to provide systematic, frequent, long-term monitoring of the magnitudes and spectra of these objects. This is something that amateur astronomers can do. Those who are equipped with appropriate spectrographs and who can systematically observe these stars over years can supply information about changes in H $\alpha$ -equivalent width (EW).

In this note, I report my spectroscopic observations of the H $\alpha$ -emission line in BU Tau (Pleione, 28 Tau) measured in units of EW. H $\alpha$ -emission was first detected in BU Tau by E. C. Pickering in 1890. Hirata (1995) describes the range of research on this interesting object in an excellent survey.

For all but two observations of BU Tau, I used the 200 mm Schmidt-Cassegrain telescope (f/4) at the Cologne Stargazer's Association Observatory in the mountains of Odenthal, Germany (latitude: 51°02' longitude: 7°15'). My spectrograph with diffraction grating has a dispersion of 0.25 Å/pixel and a wavelength range of 6500Å to 6700Å. The detector is a Kodak KAF600 sensor with 768x512 pixels. Pixels are 9x9 micrometers.

The resolving power is  $R \gg 14000$ . This telescope and instrument serve my extensive Be star monitoring program. For observations on JD 2450840 and 2451165, I used a Maksutov objective prism spectrograph that has  $f = 1000$  mm, a flint glass prism with 30° breaking angle, and a dispersion of 5.6 Å/pixel. Its resolving power is  $R = 1500$ . CCD frames containing spectra were processed with standard techniques, and H $\alpha$ -emission line EWs were measured in Richard Gray's program, MK32.

The variations of the spectrum of BU Tau, from 1938 to 1975, have been described in detail by Gulliver (1977) who give a well documented bibliography of the star. I did not observe in BU Tau the development of absorption lines for singly ionized elements such as appeared in the spectrum of 88 Her in 1959 as Balmer emission decreased.

Fig. 1 shows H $\alpha$ -behavior from JD 2434668 to 2453807 (Oct./1953 to April/2007). This includes observations by Hirata et al. (1995), Klotz (2003), Slettebak and Reynolds (1978), Andriolat and Fehrenbach (1982), Fontaine et al. (1982), Sharov, Lyutyi, and Esipov (1994), Menchenkova and Luthardt (1993), and Ojha and Joshi (1991), Stober, Mauclaire. Hirata (1995) describes the overall increase in EW as an effect of an active Be phase. Given this conditions it's interesting the short decreases in EW occurred at JD 2441584 and 2445187 in route to maximum.

Regarding references of R. Hirata the current "old" disk will be disappeared next observation periode (winter 2007) and at present a new one begins to develop. The development of this second disk is well recognized in the structure of the emission flanks (see the following spectra sequence).

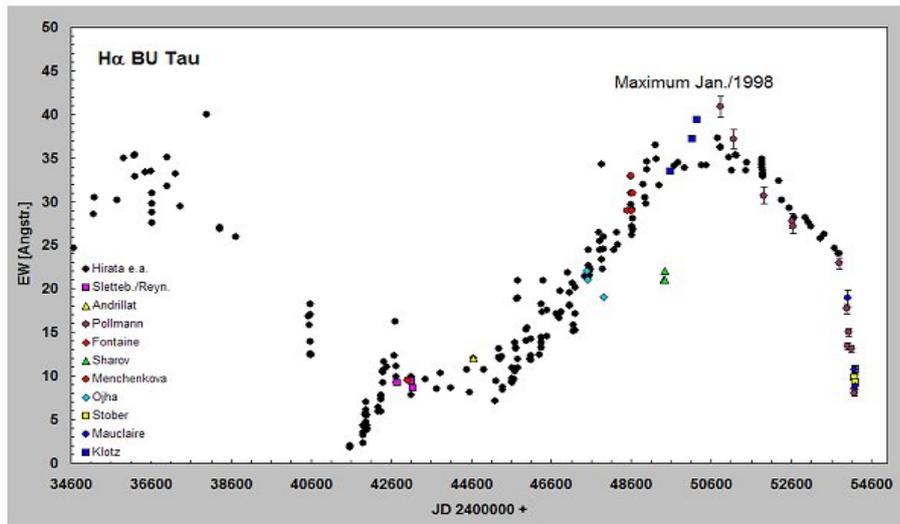
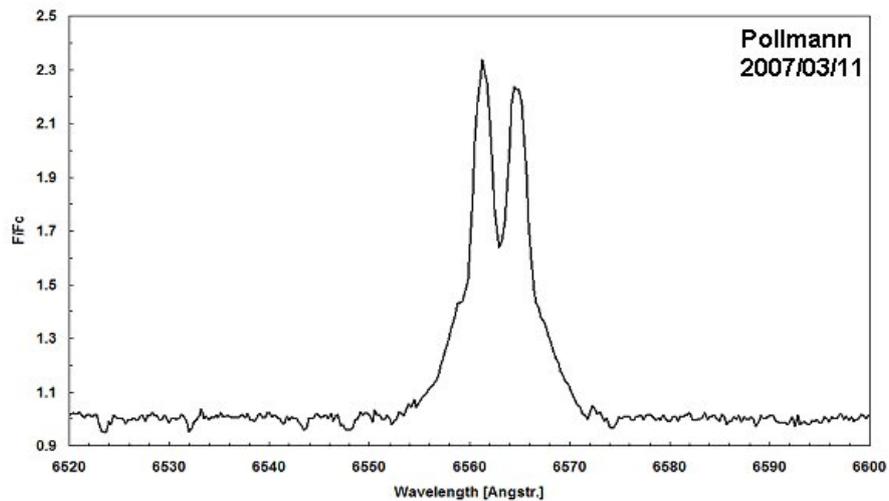
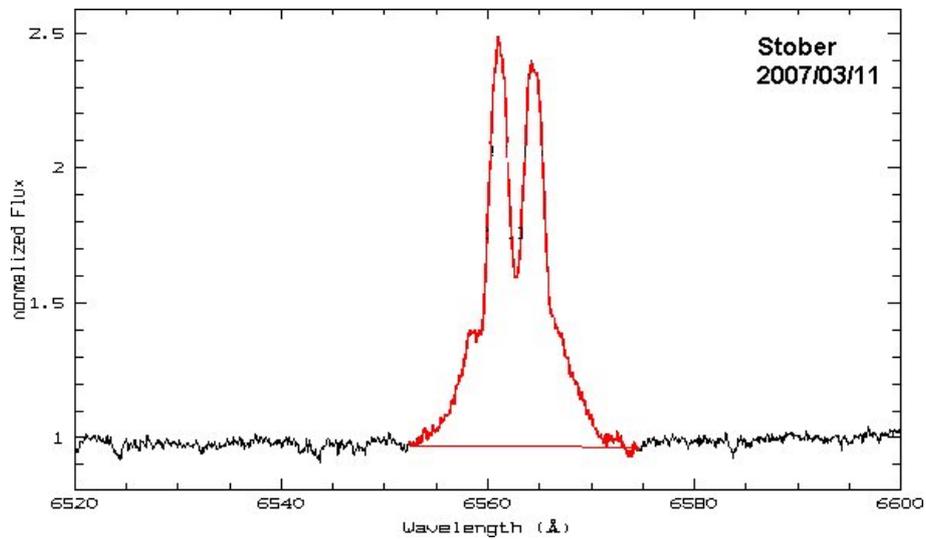
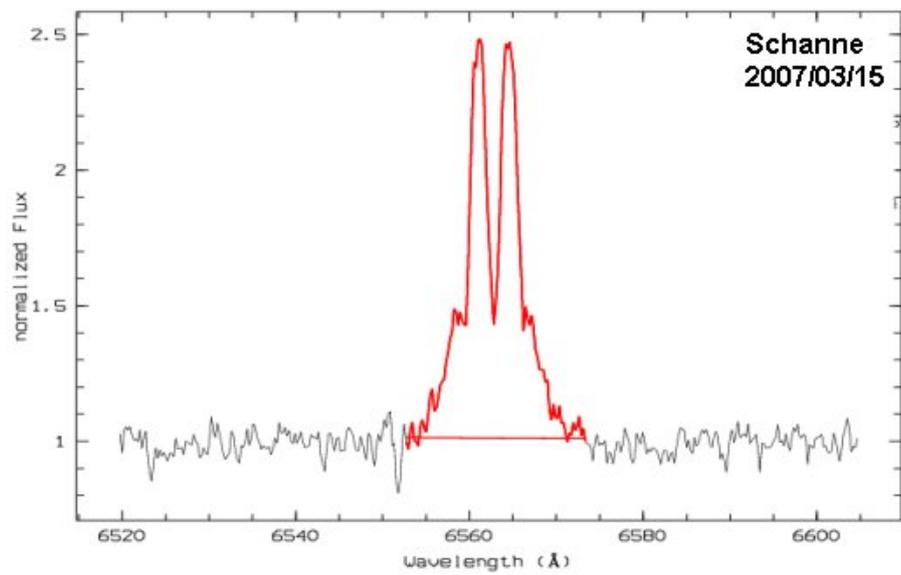
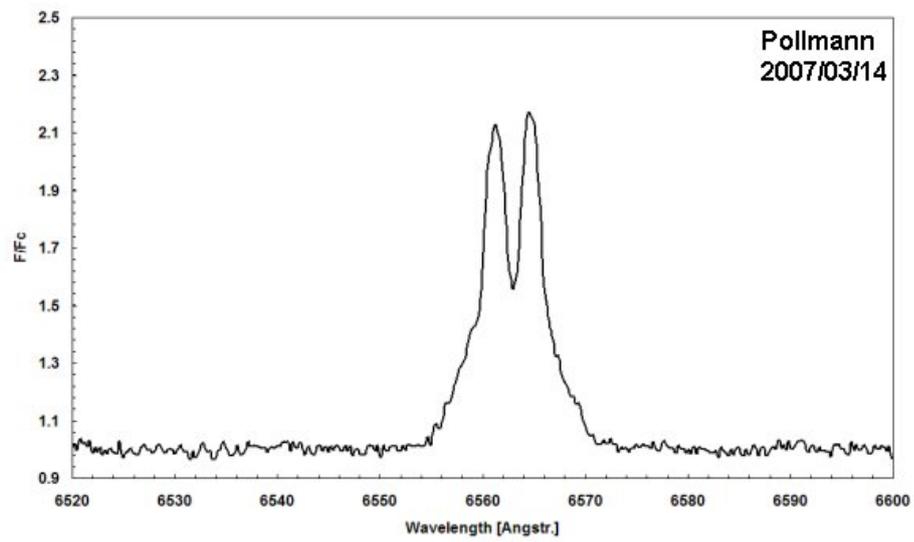
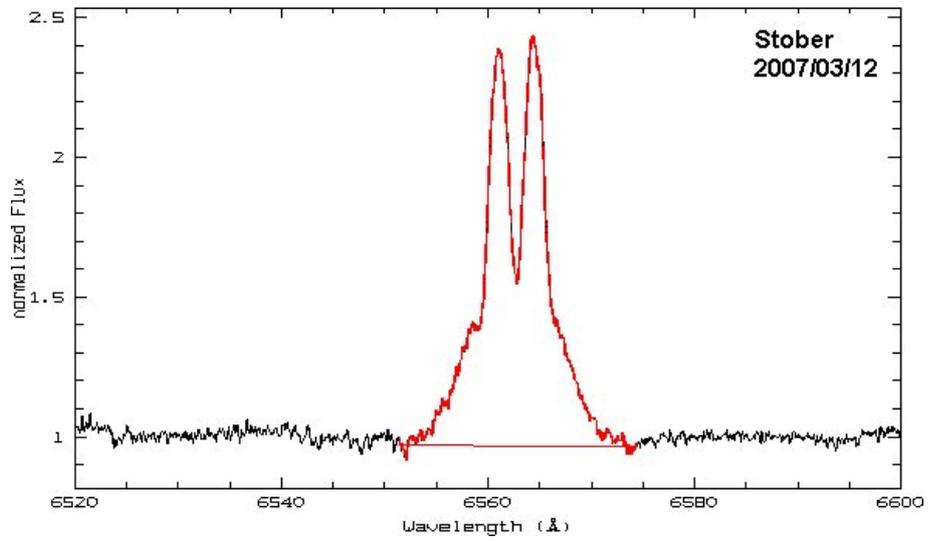
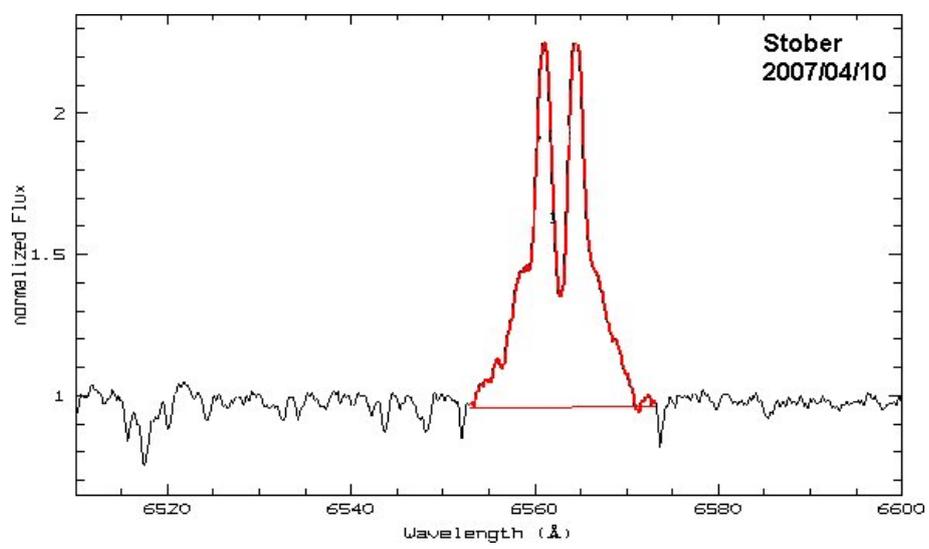
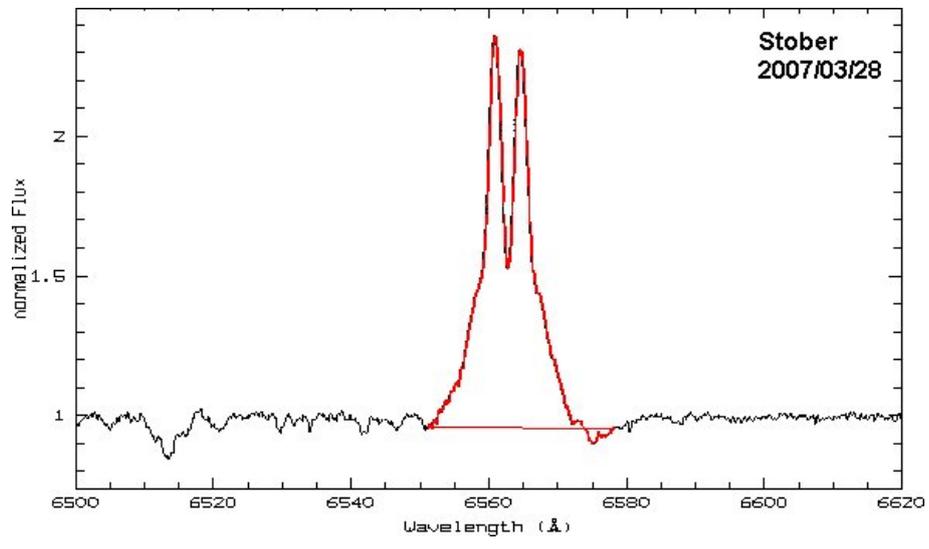
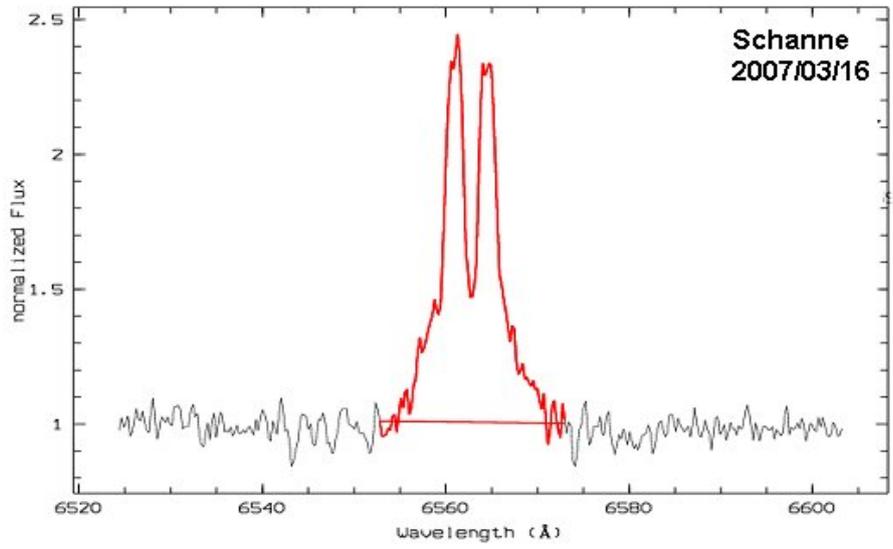


Fig. 1: Changes of the H $\alpha$ -intensity in BU Tau over 53 years, measured by several observers.







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